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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ENIN-OKUT, EDUE	
ART UNIT	PAPER NUMBER
1727	
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12/28/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/558,169	BASCHEK ET AL.	
	Examiner	Art Unit	
	Edu E. Enin-Okut	1727	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12,13 and 20-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12,13,21-27,29 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FUEL CELL AND HEATING DEVICE OF A FUEL CELL

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 22, 2010 has been entered. Applicant has amended claims 12, 29 and 30; and, cancelled claims 16 and 28. Claims 12, 13, 20-27, 29 and 30 are now pending.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. The rejection of claims 12, 13 and 20-30 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, as discussed in the previous Office Action is withdrawn because claims 12, 29 and 30 were amended, and claim 28 was cancelled.

Claim Rejections - 35 USC § 102

7. Claims 12-13 and 22-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Mattejat et al. (US 5,472,801).

Regarding claim 12, Mattejat teaches a fuel cell [fuel cell block 36], comprising a separator [38] disposed between two electrolyte-electrode units [77,80,82,84,77] (Abstract; 6:54-58; Figs. 4-5), wherein

- the separator is formed from two plates [40,42] each having an embossing and touching at contact surfaces (Figs. 4-6), wherein
- the embossings are formed as circular depressions, and wherein the embossings of the plates are offset relative to each other (5:52-57, 7:41-66; Figs. 4-6);
- a first fluid chamber for a coolant [chamber 72] is formed between the two plates and a second fluid chamber [channels/chambers 74 or 76] for a gas is formed between each plate and the adjacent electrolyte-electrode unit in each case (6:63-7:6; Figs. 4-6); wherein
- the first fluid chamber for the coolant has two subchambers, each subchamber facing one of the two plates, where the subchambers are arranged adjacent and non-planar to each other and separated by a central plane comprising of an overflow section configured to direct the coolant flow alternately through the two and non-planar subchambers (7:49-66; Figs. 4-6).

As to the first fluid chamber for the coolant has two subchambers each facing one of the two plates, and the subchambers comprise an overflow section, the cross-sectional images of the fuel cell block of Mattejat shown in Figs. 4-6 illustrate the areas where the protuberances make contact with each other. The fuel cell block shown in those figures can present an a cross-section similar to that described by Applicant in Fig. 2 of its application when a cross section is take in area other than the one shown by Mattejat.

Regarding claim 13, Mattejat discloses that the plates have at least approximately identical embossings [protuberances] (5:52-57, 7:41-48; Figs. 4-6).

Regarding claims 22-23, Mattejat teaches that the contact surfaces are distributed at least approximately uniformly over the surface of the separator (5:53-55; Figs. 4-6).

Claim Rejections - 35 USC § 103

8. The rejections of claims 12, 13, 16 and 20-30 under 35 U.S.C. 103(a) as being unpatentable by Suzuki et al. (US 7,195,837) in view of Enami (JP 10-308227) and Yasuo et al. (US 2002/0187379) are withdrawn because claims 12, 29 and 30 were amended and claims 16 and 28 were cancelled.

9. Claims 24-27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattejat et al. (US 5,472,801) as applied to claims 12-13 and 22-23 above.

Mattejat is applied and incorporated herein for the reasons above.

Regarding claims 24-27, Mattejat does not expressly teach that the total surface area of the contact surfaces is at least 10%, or 90%, of the surface area of the separator.

However, the separators of Mattejat contacts an electrode-electrolyte unit over an amount, or percentage, of its surface area (see 6:54-58; Figs. 4-6). A skilled artisan would appreciate that the degree of contact of surface area of the separator plates affects the capacity to cool the fuel cell allowing more or less surface area of coolant to flow through.

Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to assemble the fuel cell of Mattejat in a manner where the total surface area of the contact surfaces is at least 10% or 90% of the surface area of its separator as recited in claims 24-25 and 26-27, respectively, to optimize the amount of contact surface that affects the volume of coolant in contact with the separator plate depending on the amount of cooling needed by the fuel cell.

Regarding claim 29, in addition to the description of the fuel cell of Mattejat as discussed above with respect to claim 12, Mattejat also teaches a component 38 used in a fuel cell block 36 composed of two plates 40,42 disposed between electrode-electrolyte units (Abstract; 5:34-36, 5:43-48, 6:54-65; Figs. 4-6). The plates form a chamber 72 used to move a coolant 86 through the fuel cell (6:62-66), and, in turn, reduce the cell temperature. The reference also teaches that the component 38 can be used may used not only in a fuel cell block but also in process control apparatuses, such as electrochemical cells, mass transfer equipment, humidifiers and condensers (7:67-8:4).

Mattejat does not expressly teach that its component 38 is a heating device.

However, the component 38 of Mattejat cools a fuel cell using the transport of heat from the higher temperature electrode-electrolyte unit to the lower temperature coolant flowing through a chamber formed between plates of component 38. A skilled artisan would appreciate that: (1) this process can be reversed by flowing a medium through that chamber having a temperature higher than that of the electrode-electrolyte unit; and, (2) the component of Mattejat can be used in another location, such as disposed adjacent to the edge plate of a fuel cell, as evidenced by the alternative uses discussed by Mattejat.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the component of Mattejat as a heating device for a fuel cell because it is well-known in the art as a means with which to provide heat to fuel cell components that allows the cell to continue to operate under conditions below its normal, ambient operating temperature, or to heat the cell during its start-up.

Regarding claim 30, Mattejat teaches a separator [40,42] disposed between two electrolyte-electrode units [80,82,84] (5:64-6:11; Figs. 4-6). The remaining limitations recited in this claim have been addressed above with respect to claims 12 and 29.

10. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattejat et al. (US 5,472,801) as applied to claims 12-13 and 22-23 above, and further in view of Yasuo et al., (US 2002/0187379).

Mattejat is applied and incorporated herein for the reasons above.

Regarding claim 20-21, Mattejat does not expressly teach that the contact surfaces are gold-plated.

Yasuo teaches separator for a fuel cell a where the surface of the separator is plated with a precious metal, such as gold, platinum, or nickel, that has high corrosion resistance and high conductivity (Abstract; para. 9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to plate the contact surfaces of the separator used in the fuel cell of Mattejat because Yasuo teaches that this plating can impart those areas with corrosion resistance and high conductivity.

11. Claims 12-13 and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (US 2003/0162078) in view of Hulswitt et al. (US 4,569,391).

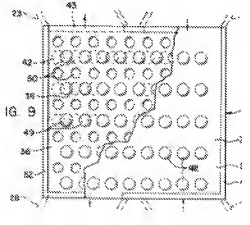
Regarding claim 12, Kikuchi teaches a fuel cell [fuel cells 102], comprising a separator [first and second separators 116,118] disposed between two electrolyte-electrode units [membrane electrode assembly (electrolyte electrode assembly) 114] (Abstract; para. 36,37,39; Figs. 1,3-6), wherein

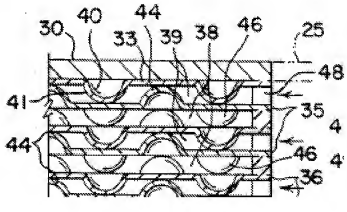
- the separator is formed from two plates [first and second separators 116,118 that include first and second metal plates 120 and 122, respectively] each having an embossing [embossed protrusions 136,140] and touching at contact surfaces [embossed protrusions 142] (para. 39,44-47; Figs. 3-6), wherein

- the embossings [embossed protrusions 136,140] are formed as circular depressions (Fig. 5),
- a first fluid chamber for a coolant [coolant flow passage 146] is formed between the two plates and a second fluid chamber [reactant gas flow passages 134,144] for a gas is formed between each plate and the adjacent electrolyte-electrode unit in each case (para. 44,47,48; Fig. 3,4,6); wherein

Kikuchi does not expressly teach that the embossings of the plates are offset relative to each other; or, the first fluid chamber for the coolant has two subchambers, each subchamber facing one of the two plates, where the subchambers are arranged adjacent and non-planar to each other and separated by a central plane comprising of an overflow section configured to direct the coolant flow alternately through the two and non-planar subchambers.

However, Hulswitt teaches a heat exchanger formed by a plurality of parallel spaced plates with the spaces between the plates defining fluid (or gas) receiving pathways (Abstract; 2:59-64). Each plate includes protuberances staggered with respect to protuberances on an adjacent plate (Abstract). An embodiment of the heat exchanger is depicted in the figures below (Figs. 9,10):





It would have been obvious to one of ordinary sill in the art at the time of the invention to offset the embossings of the separator plates used in the fuel cell of Kikuchi, and produce a first fluid chamber with two subchambers separated by an overflow section as recited in the claim, because Hulswitt teaches that plates configured in this manner facilitate the exchange of heat between fluids by increasing the surface area of the plates and increasing the turbulence of between the plates so that all the fluid can be exposed to the plates (see Hulswitt, 1:45-48).

Regarding claims 22-23, Kikuchi teaches that the contact surfaces [embossed protrusions 142] are distributed at least approximately uniformly over the surface of the separator (Figs. 3-6).

Regarding claims 24-27, Kikuchi does not expressly teach that the total surface area of the contact surfaces is at least 10%, or 90%, of the surface area of the separator.

However, the separator of Kikuchi contacts an electrode-electrolyte unit over an amount, or percentage, of its surface area (Figs. 3-6). A skilled artisan would appreciate that the degree of contact of surface area of the separator plates affects the capacity to cool the fuel cell allowing more or less surface area of coolant to flow through.

Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to assemble the fuel cell of Kikuchi, as modified by Hulswitt, in a manner where the total surface area of the contact surfaces is at least 10% or 90% of the surface area of its separator as recited in claims 24-25 and 26-27, respectively, to optimize the amount of contact surface that affects the volume of coolant in contact with the separator plate depending on the amount of cooling needed by the fuel cell.

12. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (US 2003/0162078) in view of Hulswitt et al. (US 4,569,391) as applied to claims 12-13 and 22-27 above, and further in view of Yasuo et al., (US 2002/0187379).

Kikuchi and Hulswitt are applied and incorporated herein for the reasons above.

Regarding claim 20-21, Kikuchi does not expressly teach that the contact surfaces are gold-plated.

Yasuo teaches separator for a fuel cell a where the surface of the separator is plated with a precious metal, such as gold, platinum, or nickel, that has high corrosion resistance and high conductivity (Abstract; para. 9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to plate the contact surfaces of the separator used in the fuel cell of Kikuchi, as modified by Hulswitt, because Yasuo teaches that this plating can impart those areas with corrosion resistance and high conductivity.

Response to Arguments

13. Applicant's arguments filed February 22, 2010 have been fully considered but they are not persuasive. In sum, applicant argues in its remarks that:

(a) "... The channels 62-68 [of Mattejat] are created by joining together the plates 40, 42 which have half-round groove-like indentations impressed into them in coincident fashion (Mattejat et al., col. 5, lines 52-57). In contrast, Applicant's embossings are circular depressions (dimpled pattern) instead of half-round groove-like indentations forming channels. ..." (see p. 4); and

(b) "... As the protuberances [of Mattejat] touch each other, a coolant cannot flow alternately through the subchambers of the two plates. In contrast, Applicant's circular

depressions do not touch each other such that coolant is automatically directed from one subchamber of the one plate to the opposite subchamber of the other plate." (see p. 4).

In response to applicant's arguments, please consider the following responses.

(a) First, it should be noted that the term "embossing" may be defined as "art of producing raised patterns on the surface of metal, leather, textiles, paper, and other similar substances. Strictly speaking, the term is applicable only to raised impressions produced by means of engraved dies or plates. ..." (see "embossing", Encyclopedia Britannica (2008), on Dictionary.com). Second, although applicant contends that there is a difference between "half-round groove-like indentations" of Mattejat and "circular depressions (dimpled pattern)" as recited in the instant claims, the difference in these shapes is not readily apparent to the examiner. Thus, applicant's contention is unpersuasive.

(b) This contention is addressed in the rejection of claim 12 above and repeated here for convenience: "As to the first fluid chamber for the coolant has two subchambers each facing one of the two plates, and the subchambers comprise an overflow section, the cross-sectional images of the fuel cell block of Mattejat shown in Figs. 4-6 illustrate the areas where the protuberances make contact with each other. The fuel cell block shown in those figures can present an a cross-section similar to that described by Applicant in Fig. 2 of its application when a cross section is take in area other than the one shown by Mattejat."

Further, with regard to applicant's contention that "Applicant's circular depressions do not touch each other", it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusions

14. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dalzell (US 2,281,754) teaches plate heat exchangers for fluids assembled in spaced face-to-face relation to provide shallow fluid flow spaces so different fluid streams can be circulated in contact with opposite sides of the plates for the exchange of heat from one fluid stream to another (p. 1, first column, lines 1-10; Figs. 12,13). Enjoji et al. (JP 2003-272698 A) teaches a small size and light weight fuel cell that includes a separator composed of two embossed metallic plates (Abstract).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075**. The examiner can normally be reached on Monday to Thursday, 7 a.m. - 3 p.m. (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan, can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you

would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E. Enin-Okut/
Examiner, Art Unit 1727

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1727